

# THE GRAY LINE

By Technical Systems

*The greens of a golf course can be a beautiful thing: healthy grass manicured with perfectly lined cutting stripes provides optimum putting surfaces for all golf skill levels. But what happens when those greens freeze or overheat? The grass begins to deteriorate and dead spots occur creating not only an eyesore but poor playing conditions. We have an effective solution.*



## The Problem: Maintain Playing Conditions

Southern Hills Country Club in Tulsa, OK was faced with the challenge of maintaining soil temperatures for its new Cool Season Bank grass between 65 and 80 degrees throughout the year. With the help of RAE Corporation and the Technical Systems team, a system was designed that will prevent the club's 18 greens from dying in harsh temperatures. The challenge was designing a low water pressure system that could pump hot or cold water through 9,000 linear feet of pipe. Quiet operation, energy efficiency, installation cost, and ascetics were very important factors.

## The Solution: Air to Water Heat Pump

To keep temperatures regulated, each green is heated or cooled by a series of pipes that are looped beneath the surface. TSI's Air to Water heat pump has an integrated variable flow pump package to provide flow to each green. The pumps are located in an insulated and weather proof cabinet complete with braze plate heat exchanger and necessary control valves. Each unit contain low noise, electronically commutated, permanent magnet motor fans and acoustically wrapped scroll compressors. These EC fans offer variable speed control to maintain the highest efficiency at varying loads and temperatures. The equipment has multiple compressors with independent refrigeration circuits that turn on or off depending on the required load. Each circuit contains a refrigerant reversing valve to change the unit from heating to cooling mode. When the unit is placed in the heating mode it is over 300 percent more efficient compared to a gas boiler which is approximately 97 percent efficient. To quantify, when temperatures reach 35 degrees or lower, each kilowatt used to operate the compressors will produce more than three kilowatts of heat to the greens.



*Take a look at this behind the scenes video of our RAE Corporation employees working hard on the units. Scan QR code or [click here](#).*

## Key Takeaways:

- A single system heats and cools the greens in lieu of separate boilers and chillers.
- Direct Digital control system to maintain maximum efficiency that can be controlled and monitored by the main building management system.
- Each heat pump was fully operated at the factory prior to shipment.
- Low sound design keeps the golf course quiet, without sacrificing performance.

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**We Listened. We Solved. We Will Support.**

**#GoGray**